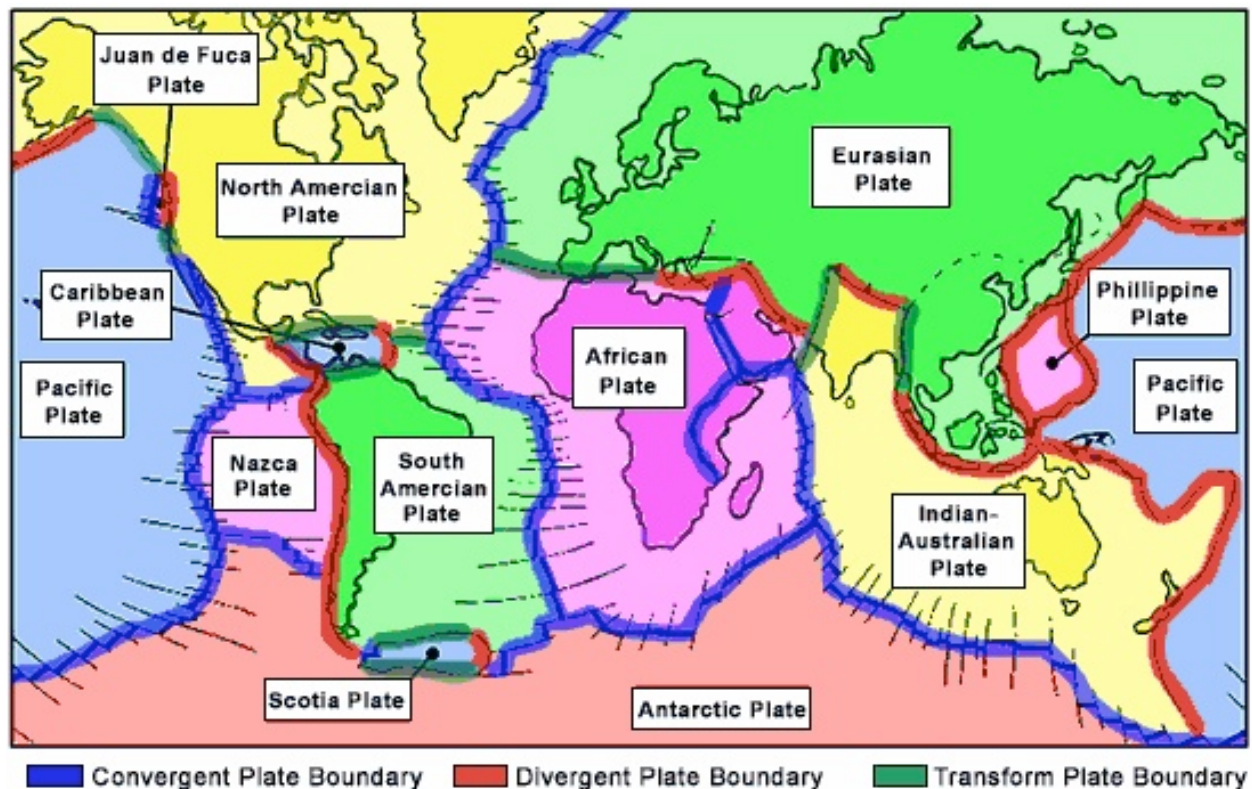


THE LITHOSPHERE AND PLATE TECTONICS

The layer of the mantle above the asthenosphere plus the entire crust make up a region called the lithosphere. The lithosphere, and therefore, the earth's crust, is not a continuous shell, but is broken into a series of plates that independently "float" upon the asthenosphere, much like a raft on the ocean. These plates are in constant motion, typically moving a few centimeters a year, and are driven by convection in the mantle. The scientific theory that describes this phenomenon is called plate tectonics. According to the theory of plate tectonics, the lithosphere is comprised of some seven major plates and several smaller ones. Because these plates are in constant motion, interactions occur where plate boundaries meet.

A convergent (colliding) plate boundary occurs when two plates collide. If the convergent boundary involves two continental plates, the crust is compressed into high mountain ranges such as the Himalayas. If an oceanic plate and a continental plate collide, the oceanic crust (because it is more dense) is subducted under the continental crust.



The region where subduction takes place is called a subduction zone and usually results in a deep ocean trench such as the "Mariana Trench" in the western Pacific ocean. The subducted crust melts and the resultant magma can rise to the surface and form a volcano. A divergent plate boundary occurs when two plates move away from each other. Magma upwelling from the mantle region is forced through the resulting

cracks, forming new crust. The mid-ocean ridge in the Atlantic ocean is a region where new crustal material continually forms as plates diverge. Volcanoes can also occur at divergent boundaries. The island of Iceland is an example of such an occurrence. A third type of plate boundary is the transform boundary. This occurs when two plates slide past one another. This interaction can build up strain in the adjacent crustal regions, resulting in earthquakes when the strain is released. The San Andreas Fault in California is an example of a transform plate boundary.